

WHAT IS CLAIMED IS:

1           1. A micro electromechanical systems (MEMS) device comprising:  
2           a scanning probe microscopy (SPM) component; and  
3           one or more fluidic channels formed in the SPM component.

1           2. The MEMS device of claim 1 wherein the SPM component is used for  
2 nanomachining.

1           3. A micro electromechanical systems (MEMS) device comprising:  
2           a scanning probe microscopy (SPM) component;  
3           at least one fluidic channel formed in the SPM component; and  
4           a venturi tube formed along a portion of the fluidic channel,  
5           wherein a vacuum can be developed by a flow of a gas or fluid through venturi  
6 tube.

1           4. A micro electromechanical systems (MEMS) device comprising:  
2           scanning probe microscopy (SPM) component;  
3           a fluidic channel formed in the SPM component, the fluidic channel  
4 configured to deliver fluid to a tip of the SPM component;  
5           an amount of an isotope disposed along the fluidic channel,  
6           wherein the particles emitted by the isotope can be delivered by a fluid  
7 flowing in the fluidic channel to the tip to affect the charge distribution in a region about the  
8 tip.

1           5. The MEMS device of claim 4 wherein the particles delivered to the tip  
2 can be used to perform nanomachining on a workpiece.

1           6. A micro electromechanical systems (MEMS) device comprising:  
2           scanning probe microscopy (SPM) component;  
3           an amount of an isotope disposed on the SPM component;  
4           a circuit for collecting particles emitted from the isotope to store an  
5 accumulated charge; and  
6           a contact formed on the circuit to provide an amount of current that can be  
7 produced from the accumulated charge.

1               7.     The MEMS device of claim 6 wherein the amount of isotope  
2 comprises an isotopic charge emitter, wherein the accumulated charge can serve as a source  
3 for local electrical power to operate active electronic elements located on or near the MEMS  
4 device.

1               8.     The MEMS device as recited in claim 4 which uses Americium 241.

1               9.     The MEMS device as recited in claim 4 wherein the amount of isotope  
2 is disposed in a single isotopic region on the SPM device, wherein the single isotopic region  
3 contains 1 microcurie or less of radioactivity.

1               10.    The MEMS device such as in claim 4 wherein the amount of isotope  
2 comprises a plurality of isotopic regions, each of which contains 1 microcurie or less of  
3 radioactivity.

1               11.    Any nanocavitation technique which uses an nanocavitation inducing  
2 member to image or measure the surface to which the cavitation is to interact with by a  
3 Scanning Probe Microscopy Method.

1               12.    Any nanoelectric discharge machining in which the electric discharge  
2 tool also serves to image or measure the surface to be machined by any Scanning Probe  
3 Microscopy Method.

1               13.    Any outflow, inflow, circulating or recirculating fluid system in which  
2 the Scanning Probe Microscopy means is integrated with the fluid transfer means.

1               14.    Any outflow, inflow, circulating or recirculating fluid system in which  
2 nanomachining or surface modification by any means is conducted by a means integrated  
3 with said means.

1               15.    The device such as described in claim 4 in which an integrated or  
2 external circuit monitors the charge build up which is inversely proportional to rate of gas  
3 flow through the system removing charge from the channels.

1               16.    The device as described in claim 1 in which local or integrated pumps  
2 and/or valves provide for the delivery and/or control of fluids or gases.

1               17.     The device as described in 16 above in which the fluid channel also  
2     functions as an active mechanical or electromechanical member.

1               18.     The device as described in 16 above in which the movable members  
2     act as passive elements.

1               19.     The device as described in 16 above in which the movable members  
2     act as passive elements and are activated or operated by external mechanical, vacuum, or  
3     fluid induced forces.

1               20.     The device as described in 16 above in which the movable members  
2     act independently to provide new functions.

1               21.     The device as described in 16 above in which the movable members  
2     act independently to provide scanning or motion for any reason in or near the plane of the  
3     cantilever.

1               22.     The device as claimed in 4 which is a composed of a diode or  
2     electrically similar region in close proximity to the emitted radiation.

1               23.     Any system for Scanning Probe Microscopy, Nanomachining,  
2     Nanomanipulation, or multimode operation in which the mechanical, electrical, electro-  
3     optical, radiological, are changed by mechanical or electrical means.

1               24.     Any system for Scanning Probe Microscopy, Nanomachining,  
2     Nanomanipulation, or multimode operation in which the modality of operation is obtained by  
3     use of mecahnical members interacting with or substituting for the primary sense or  
4     interaction structure.

1               25.     The device of claim 4 which is composed of a diode formed by an  
2     intrinsic layer of diamond coupled with a doped layer of diamond.

1               26.     Any application, measurement or operation in which the device of 10  
2     acts in a specific or constrained region.

1                   27. Any application, measurement or operation as in 26 in which the  
2 application uses chemical or biological chips or devices in which material for the operation,  
3 application or measurement is placed in wells in a regular arrangement on a plane or  
4 surface(s).

1                   28. Any application, measurement or operation as in 26 in which the  
2 target material is DNA which has been marked optically, electrically or chemically so as to  
3 interact with optical, electrical or chemical detectors or emitters associated with or integrated  
4 in the device.

1                   29. The device as described in 16 above in which the movable members  
2 act independently and are electrically sensed and this information or sense current or voltage  
3 used to control the movable members.

1                   30. The device as described in 16 above in which the movable members  
2 act independently and are electrically sensed and this information or sense current or voltage  
3 used to obtain a particular motion or displacement of the structure the arms act on including  
4 obtaining zero displacement.

1                   31. The device in claim 4 in which the layers comprising the device consist  
2 of a conductor, intrinsic diamond and a conductor as successive layers.

1                   32. The device of claim 4 in which the layers comprising the device  
2 consist of boron doped diamond, intrinsic diamond and a conductor as successive layers.

1                   33. The device of claim 4 in which the layers comprising the device  
2 consist of boron doped diamond, intrinsic diamond and a doped SiC as successive layers.

1                   34. The device of claim 4 in which the layers comprising the device  
2 consist of boron doped diamond, intrinsic silicon carbide and a conductor as successive  
3 layers.

1                   35. The device of claim 4 in which the layers comprising the device  
2 consist of boron doped diamond, intrinsic silicon carbide and doped silicon carbide as  
3 successive layers.